IN THE CLAIMS

1. (Currently amended) A signal processing method comprising the steps of:

processing a signal in a signal processing device configured to implement a transform for producing a desired transformed output signal; and

updating the transform during the processing step based on received data associated with the signal being processed, so as to track a basis associated with the transform;

wherein the transform is represented in a reduced-parameter form and the updating step is implemented using computations involving the reduced-parameter form, the computations being configured to provide local optimization of an energy compaction property of the transform for a given pair of transform coefficients.

2. (Original) The method of claim 1 wherein the transform comprises a Karhunen-Loève transform.

3. (Original) The method of claim 1 wherein the reduced-parameter form for an N x N transform comprises fewer than N^2 parameters.

4. (Original) The method of claim 1 wherein an adaptation of the transform is represented directly as one or more changes in the reduced-parameter form.

5. (Original) The method of claim 1 wherein the reduced-parameter form comprises a Givens parameterized form.

6. (Original) The method of claim 5 wherein the updating step utilizes multiplications of Givens parameterized matrices computed in parametric form.

7. (Original) The method of claim 1 wherein the reduced-parameter form comprises a Householder form.

8. (Original) The method of claim 1 wherein the updating step avoids the need for an explicit eigendecomposition operation in implementing the transform.

9. (Original) The method of claim 1 wherein the updating step makes adjustments in the transform so as to minimize a negative gradient of a pairwise energy compaction property of the transform.

10. (Original) The method of claim 9 wherein the negative gradient minimization is locally convergent in mean for a specified step size.

11. (Currently amended) ~~The method of claim 9~~ A signal processing method comprising the steps of:

processing a signal in a signal processing device configured to implement a transform for producing a desired transformed output signal; and

updating the transform during the processing step based on received data associated with the signal being processed, so as to track a basis associated with the transform;

wherein the transform is represented in a reduced-parameter form and the updating step is implemented using computations involving the reduced-parameter form;

wherein the updating step makes adjustments in the transform so as to minimize a negative gradient of a pairwise energy compaction property of the transform; and

wherein the adjustment for a kth parameter of the transform associated with a particular one of a plurality of Givens rotations is given by $\theta_k = \mu 2 y_{i_k} y_{j_k}$, where μ is the step size of the gradient algorithm, y_i and y_j are designated pairs of elements of a matrix $Y = TXT^T$, T is a matrix representing the transform, and X is a matrix representing elements of the signal being processed.

12. (Original) The method of claim 1 wherein the transform comprises a backward adaptive transform and the updating step is driven by quantized data.

13. (Currently amended) An apparatus comprising:

a signal processing device comprising an integrated circuit, the device being configured to implement a transform for processing a signal so as to produce a desired transformed output signal, the device further being operative to implement a process for updating the transform while processing the signal, in accordance with received data associated with the signal, wherein the transform is represented in a reduced-parameter form and the updating process is implemented using computations involving the reduced-parameter form, the computations being configured to provide local optimization of an energy compaction property of the transform for a given pair of transform coefficients.

14. (Original) The apparatus of claim 13 wherein the transform comprises a Karhunen-Loève transform.

15. (Original) The apparatus of claim 13 wherein the reduced-parameter form for an $N \times N$ transform comprises fewer than N^2 parameters.

16. (Original) The apparatus of claim 13 wherein an adaptation of the transform is represented directly as one or more changes in the reduced-parameter form.

17. (Original) The apparatus of claim 13 wherein the reduced-parameter form comprises a Givens parameterized form.

18. (Original) The method of claim 17 wherein the updating process utilizes multiplications of Givens parameterized matrices computed in parametric form.

19. (Original) The apparatus of claim 13 wherein the reduced-parameter form comprises a Householder form.

20. (Original) The apparatus of claim 13 wherein the updating process avoids the need for an explicit eigendecomposition operation in implementing the transform.

21. (Original) The apparatus of claim 13 wherein the updating process makes adjustments in the transform so as to minimize a negative gradient of a pairwise energy compaction property of the transform.

22. (Original) The apparatus of claim 21 wherein the negative gradient minimization is locally convergent in mean for a specified step size.

23. (Currently amended) ~~The apparatus of claim 21~~ An apparatus comprising:

a signal processing device comprising an integrated circuit, the device being configured to implement a transform for processing a signal so as to produce a desired transformed output signal, the device further being operative to implement a process for updating the transform while processing the signal, in accordance with received data associated with the signal, wherein the transform is represented in a reduced-parameter form and the updating process is implemented using computations involving the reduced-parameter form;

wherein the updating process makes adjustments in the transform so as to minimize a negative gradient of a pairwise energy compaction property of the transform; and

wherein the adjustment for a *k*th parameter of the transform associated with a particular one of a plurality of Givens rotations is given by $\theta_k = \mu 2 y_{i_k} y_{j_k}$, where μ is the step size of the gradient algorithm, y_i and y_j are designated pairs of elements of a matrix $Y = TXT^T$, T is a matrix representing the transform, and X is a matrix representing elements of the signal being processed.

24. (Original) The apparatus of claim 13 wherein the transform comprises a backward adaptive transform and the updating step is driven by quantized data.

25. (Currently amended) A machine-readable medium for storing one or more software programs for use in processing a signal in a signal processing device configured to implement a transform for producing a desired transformed output signal, the one or more software programs when executed implementing the step of:

updating the transform based on received data associated with the signal being processed, so as to track a basis associated with the transform;

wherein the transform is represented in a reduced-parameter form and the updating step is implemented using computations involving the reduced-parameter form, the computations being configured to provide local optimization of an energy compaction property of the transform for a given pair of transform coefficients.